THE UNITED STATES PATENT AND TRADEMARK OFFICE
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY/US

APPLICANT	Detig
SERIAL NO.	PCT/US99/23612
INT'L FILING DATE	12 October 1999
TITLE	ELECTROSTATIC PRINTING OF FUNCTIONAL TONER MATERIALS FOR ELECTRONIC MANUFACTURING APPLICATIONS

Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 202031

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner of Patents and Trademarks, Box PCT, Washington, D.C. 20231.

Date of Deposit : Sept. 21, 2000

Name : Richard C. Woodbridge

Signature

Date of Signature : Sept. 21, 2000

REPLY TO WRITTEN OPINION

Dear Sir:

There are 22 claims in the above referenced application. Claims 1-8 and 10-22 were deemed to possess both novelty and inventive step, but claim 9 has been deemed to lack novelty and an inventive step. Applicant respectfully disagrees with this conclusion regarding claim 9 and has submitted an amended page 28 of the application containing an amended claim 9. Applicant has amended claim 9 to better explain the claimed subject matter and to clarify the method claimed therein.

With respect to novelty and inventive step, the Examiner has cited Kato (US 5,689,785) as disclosing a "reversal development...made from a negative image that is irradiated with a laser beam and development is carried out using a toner having a same polarity chargeability as in the charging of the photoreceptor." By contrast, however, the Applicant's claim 9 specifically refers to "using corona discharge to generate ions of the opposite polarity to the toner", and thus referring to a different type of process than the Kato reference.

In fact, Applicant's claim 9 describes a "normal" imaging process, where an electrostatic printing plate is exposed so that charged areas are developed. It is known to those skilled in the electrostatic printing and photographic arts that a negative photo tool has clear image elements and opaque background elements. Exposing the electrostatic plate to a negative photo tool would thus produce a positive resistance image, one in which the plate has cross-linked photopolymer image regions and an unexposed photopolymer background region. The cross-linked image regions have higher resistivity and store an electrostatic charge while the unexposed background region discharges. The plate is then charged using a corona discharge where the ions generated are of the opposite polarity to the toner.

The charged plate is then ready to be developed with toner particles of the opposite polarity as the charged/cross-linked areas, as illustrated in Fig. 10a with positive charged areas and negative toner particles. After the image is developed, it is transferred to the receiving glass 442 with an electric field of the same polarity as the charged areas, as discussed on page 15, lines 15-17. The imaging method of claim 9 has an advantage over a reversal image process during this transfer because as discussed on page 15, charges will be induced in the lower resistivity areas. The background areas have induced charges with the same polarity as the toner particles, causing the toner to "focus" towards the image regions and away from the background regions because the toner is of the opposite polarity as the image regions. By contrast, in a reversal process (such as described in Kato) the toner particles move away from the cross-linked background regions but do not necessarily attract to the non-cross-linked image regions. The method for producing charged areas in claim 9 thus has the advantage of preparing the plate for a "normal" imaging process, as compared with the Kato reference.

The Applicant believes that the method delineated in claim 9 to be patentably distinguishable from the process described by Kato and that the present invention clearly displays the requisite novelty and inventive step.

Respectfully submitted,

Richard C. Woodbridge
Reg. No. 26, 423

Woodbridge & Associates, P.C.
P.O. Box 592
Princeton, NJ 08542-0592
Tel (609) 924-3773
Fax (609) 924-1811

i. a drying station (27) where warm air is provided to dry said glass plate after imaging; and,

j. support means (28) for supporting said glass plate (26) on it's edges so that said free charges in said glass tightly bind toner particles to the surface of said glass plate (26) after transfer.

Claim 3. The apparatus of claim 1 further comprising:

k. positive phototool means for exposing said electrostatic printing plate to actinic radiation in order to cross-link the non-imaged elements of said printing plate (10) while the image elements are unexposed and not cross-linked.

Claim 4. The apparatus of Claim 1 wherein said discharge areas of said printing plate (10) develop said toner particles.

Claim 5. The apparatus of Claim 4 wherein the polarity of said corona ions is identical to that of the toner particles in the liquid toner (50).

Claim 6. The apparatus of Claim 1 wherein said developer unit (16) includes an electrode (18, 22) which is electrically biased to a value approximately equal to the charged voltage of said printing plate (11).

Claim 7. The apparatus of Claim 1 wherein said receiving glass plate (26) is dried of excess liquid (46) by air (27) at substantially room temperature which is blown thereover to partially fix said toner.

Claim 8. The apparatus of Claim 1 wherein said toner comprises at least three functional particle toners.

Claim 9. A method for producing charged areas on an electrostatic printing plate which is to be developed with toner particles, by the steps of:

a. exposing said plate with a negative photo tool;

b. using corona discharge (56) to generate ions of the opposite polarity to the toner (50); and,

c. biasing the developer unit electrode to approximately 100 volts more than the image plate (11) voltage, in the background areas.

Claim 10. An apparatus (134) for the printing of functional toners on a flat glass plate, said apparatus comprising: